

REMARKS

Claims 1-25 and 32-34 are pending. Non-elected claims 26 to 31 have been previously canceled without prejudice.

Claims 1, 5, 14, 21 and 32 have been amended to recite "an oxide film formed on a front and back surface of the heat radiating surface." Support for such an amendment can be found, for example, in FIG. 1B and on page 24, line 23 to page 25, line 1 of the application. No new matter has been added.

Claim Rejections - 35 USC §112

Claims 12 and 32 to 34 have been rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

In the office action, it argues that there is no antecedent for "curved side" in claim 12. However, claim 12 does not use the term, "curved side." Therefore, this rejection is moot.

Claims 32 to 34 have been rejected for having an allegedly unsupported term, "precision electronic equipment" and "sliding portions." The terms are supported on page 20, line 25 to page 21, lines 6. It basically states that the precision electronic equipment, such as a hard disk with a magnetic head and a recording disk, contains a driving portion and a sliding portion. The term is supported by the specification.

In view of the above comments, applicants respectfully request withdrawal of this rejection.

Claim Rejections – 35 USC §103

Claims 1 to 5, 7 to 12, 14, 16 to 19, 21, 24, and 25 have been rejected as being unpatentable over Lee. Applicants respectfully submit the claims are not obvious over the cited prior art for the following reasons.

Claim 1 as amended recites:

1. (Currently Amended) A heat radiating device comprising:
a heat radiating substrate containing Al as a major component; and
a metal film containing Cu, Ag, Sn, Ni, or Au disposed on the heat radiating substrate; and

an oxide film formed on a front and back surface of the heat radiating substrate. (Emphasis added)

The Lee patent fails to disclose, teach or suggest the above bolded feature. For example, FIG. 3 shows a an IC chip 70 mounted on a substrate 60 with a heat sink 80 mounted to a back surface 72 of IC chip 70 and a heat sink 63 mounted to a region of the front surface of IC chip 70. (See column 4, lines 26-33) The Lee patent makes no mention of an oxide film as recited in claim 1 of the present invention. Thus, claim 1 is patentable over the Lee patent for at least this reason.

Claims 5, 14, 21 and 32 have been amended to include a feature similar to the above bolder feature in amended claim 1. Thus, claims 5, 14, 21 and 32 should be patentable for at least the same reasons as claim 1 as explained above.

In addition, it is alleged that Lee discusses provision of using aluminum in column 1 and that the substitution of aluminum for copper is well known in heat sink technology as established by the prior art teachings of Lee.

However, contrary to this assertion, there is no discussion of aluminum whatsoever in column 1. The only mention of aluminum is in column 5, line 64, with reference to a bonding pad 73A.

It is reasserted that the patent to Lee does not teach or suggest any heat sink containing aluminum as a major component. Lee's Figs. 3, 7, 8, 11 and 12 teach using a heat sink made of Cu. Furthermore, a description on Lee's Figs. 1 states: "A heat sink 25 is mounted on the back surface 12 of chip 10, typically by forming a gold-silicon eutectic bond 26 between the heat sink 25 and the chip 10." Nowhere in the patent to Lee is there a description that the heat sink 25 is made of aluminum.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). The prior art does not teach or suggest the present feature of claim 1 as indicated above. Indeed, the other parts of the patent suggest using Cu, not Al for the heat sink.

Further, because the prior art suggests using a Cu heat sink and attaching a solder to this heat sink (see, for example, Fig. 7), a person of ordinary skill in the art would not have been

taught, suggested, or motivated to use Al as a major component for the heat sink. Moreover, a skilled person would not have been motivated to use Al because it is known in the art that adhering a brazing solder on aluminum would be difficult (see page 22, lines 10 to 18 of the present specification).

It is further pointed that the advantageous effects of the present invention are not appreciated by the prior art. An oxide film formed on Lee's copper heat sink would not be stable. When a heat sink made of Cu is exposed to a highly humid environment, fine oxide is scattered. The scattered oxide adversely affects electronic devices provided around the heat sink. In contrast, an oxide film formed on a heat radiating substrate containing Al is dense, and therefore, oxide is not scattered to adversely affect the surrounding devices. Also, the use of Al instead of Cu would further reduce the weight of the device.

Thus, Lee's Figs 3 to 10 as applied to copper could not be equally applied to aluminum.

At least for the foregoing reasons, claims 1 to 5, 7 to 12, 14, 16 to 19, 21, 24, and 25 would not have been obvious to a person of ordinary skill in the art from the cited prior art reference.

In view of the above amendment and comments, applicants respectfully request withdrawal of this rejection.

Allowable Subject Matter

Claims 6, 13, 15, 20, 22, and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants thank the Examiner for the allowable subject matter. However, in view of the arguments above with regard to the base claims, applicants respectfully decline to rewrite claims 6, 13, 15, 20, 22, and 23 in independent form.